

High performance liquid chromatography, or HPLC, is a method used to separate out the compounds in a chemical mixture. It is a versatile method of analysis that has a number of HPLC applications.

How HPLC Works

In the most basic way, HPLC works by passing a sample of the mixture under pressure through a column filled with silica beads, or another absorbent material along with a mobile liquid phase used to help separate the chemical structures. As the sample flows through, each component will interact with the column material in a different way and will exit the column at different times, allowing them to be individually collected and analyzed.

HPLC Applications

The goal of separation is to quantify, identify, or purify the various compounds, which has a variety of HPLC applications in the real world. This allows applications which are applicable in almost every market and industry type, such as:

HPLC in Pharmaceutical/Biopharmaceutical

The pharmaceutical industry is one of the biggest users of HPLC. They use it primarily to

check the purity and consistency of the products they make. They also use it to:

- Evaluate formulations
- Monitor how changes to a product or scaling up production affects the product
- Separate out compounds to be used in the production of new drugs
- Characterize molecules that can be used to manufacture new drugs

Find new Pharmaceutical LC Applications: www.phenomenex.com/pharmaceutical

Biopharmaceuticals has gained rapid growth, even more than previously predicted due to the commercialized COVID-19 vaccine but brings a slew of new LC applications.

The daunting task of identifying post-translational modifications and accuracy for large biomolecules is made possible through advances in chromatography and mass spectrometry. With a combination of classical chromatographic methods such as **size exclusion chromatography (SEC)**, **reversed phase (RP)**, and **ion exchange chromatography**

(IEX), but also on newer separation modes including **hydrophilic interaction chromatography (HILIC)** and hydrophobic interaction chromatography (HIC).

Read about some of the changes in the drug market from
<https://phenomenex.blog/2018/04/17/biopharmaceuticals/>

HPLC in Clinical Research/Toxicology

HPLC is a highly accurate method for analyzing the nutrient composition of blood (such as testing for vitamin D) and for analyzing other types of clinical research samples, such as:

- Urine and blood for the presence of antibiotics
- Bilirubin and biliverdin analysis for hepatic disorders
- Endogenous neuropeptides in cerebrospinal fluid

When there is a question of doping and drug use, HPLC can be used to analyze urine samples to detect traces of drugs in the system. This includes the detection of doping

agents, metabolites, and drugs such as cannabis, cocaine, LSD, and opioids. This can also be applied to forensic investigations, whether testing to detect the presence of drugs in the system of a victim or perpetrator or to analyze the dyes used in textiles.

HPLC in Food Safety and Food Quality

When it comes to the production of food, HPLC can be used to analyze samples to determine the makeup of the chemicals used in agriculture and food production. Pesticides and food additives can be identified and quantified to determine the safety of a food product. It can also be used to determine the quality of water and soft drinks, analysis the sugars in fruit juices, and analyze the polycyclic compounds present in vegetables.

HPLC in Environmental

When it comes to the environment, HPLC is helpful in the bio-monitoring of pollutants and pollution levels and the detection of phenolic compounds in drinking water. Environmental samples can include waste water, drinking water, soil, sediments, and many more diverse matrices.

If you have any questions about the applications of HPLC or need technical assistance, Phenomenex offers a free, 24/7, online Technical Support service - **Chat Now**.

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